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Requester's Full Name: INE FENSTERMACHER Examiner #: 72421 Date: 3/29/02
 Art Unit: 3602 Phone Number 30 5-7438 Serial Number: 09/05/248
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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include: the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: _____

Inventors (please provide full names): _____

Earliest Priority Filing Date: _____

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5996431

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Date Completed: _____	Litigation _____	Lexis/Nexis <u>✓</u>
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Terms: **patno=5996431** ([Edit Search](#))

*Pat. No. 5996431, **

5,996,431

◆ GET 1st DRAWING SHEET OF 4

Dec. 7, 1999

Twist action friction drive

INVENTOR: Pierse, Michael George, Bedford, United Kingdom

ASSIGNEE-AT-ISSUE: Unova U.K. Limited, Avlesbury, United Kingdom (03)

APPL-NO: 51,248

FILED: Apr. 2, 1998

PCT-FILED: Apr. 30, 1997

PCT-NO: PCT/GB97/01174

PCT-PUB-NO: WO98/10206

PCT-PUB-DATE: May 12, 1998

INT-CL: [6] F16H 21#16

US-CL: 74#25; 74#89

PRIM-EXMR: Graysay, Tamara L.

ASST-EXMR: Fenstermacher, David

CORE TERMS: roller, drive, driven, tube, friction drive, oil, skewed, hydrostatic, axial, forward...

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Terms: **patno=5996431** ([Edit Search](#))

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Segments: After-issue, Appl-no, Assign-action, Assign-contact, Assign-date, Assign-frame, Assign-reel, Assignee, Assignor-info, Asst-exmr, At-issue, Certcorr, Date, Disclaimer, Exmr, Expiration-date, Filed, Govt-int, Int-cl, Inventor, Lit-reex, Patno, Pct-filed, Pct-no, Pct-pub-date, Pct-pub-no, Prim-exmr, Reex-cert, Reissue, Rel-us-data, Title, Us-cl

Date/Time: Friday, March 29, 2002 - 11:45 AM EST

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Federal Courts &
Admin. Material*

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** SS 1: Results 1

Search statement 2

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ER 6

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Search statement 2

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1/1 PLUSPAT - (C) QUESTEL-ORBIT

PN - US5996431 A 19991207 [US5996431]

TI - (A) Twist action friction drive

PA - (A) UNOVA UK LTD (GB)

IN - (A) PIERSE MICHAEL GEORGE (GB)

AP - US5124898 19980402 [1998US-0051248]

PR - GB9618642 19960906 [1996GB-0018642]

- WOGB9701174 19970430 [1997WO-GB01174]

IC - (A) F16H-021/16

EC - F16H-019/02B

PCL - ORIGINAL (O) : 074025000; CROSS-REFERENCE (X) : 074089000

DT - Corresponding document

CT - US4203328; US4760864; US4921207; US5363711; DE3005147; JP61038256

- Marks' Standard Handbook For Mechanical Engineers, 10th Ed, pp. 8-130 to 8-131.

STG - (A) United States patent

AB - PCT No. PCT/GB97/01174 Sec. 371 Date Apr. 2, 1998 Sec. 102(e) Date Apr. 2, 1998 PCT Filed Apr. 30, 1997 PCT Pub. No. WO98/10206 PCT Pub. Date May 12, 1998A twist action roller friction drive comprises a rotating drive bar which drives in rotation a roller the axis of rotation of which is inclined relative to the axis of a rotationally fixed driven member with which the roller engages. The inclined roller comprises a single annular roller urged from the inside into driving contact with the driven member by one or more hydrostatic pads. The driven member is a tube and the skewed annular roller is in frictional engagement with the bore of the tube. In a typical use, the tube is fixed to the carriage of a machine tool and is aligned with the machine axis. Oil for the hydrostatic pad(s) acting on the roller is supplied through the drive bar along the axis thereof At its trailing end, the drive bar rotationally drives a skewed roller assembly in which the annular roller is incorporated, the remote forward end of the drive bar being driven in rotation, as by an electric motor Axial movement of the driven member is principally determined by the angle of skew of the roller so that if this angle is made very small, similarly small precise axial movements of the driven member of as little as 1 nm (nanometre) or less can be readily achieved, per revolution of the drive bar. This permits a high speed drive motor and in turn velocity feed back control.

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1/1 LGST - (C) LEGSTAT
PN - US 5996431 [US5996431]
AP - US 51248/98 19980402 [1998US-0051248]
DT - US-P
ACT - 19980402 US/AE-A
APPLICATION DATA (PATENT)
{US 51248/98 19980402 [1998US-0051248]}
- 19991207 US/A
PATENT
UP - 2000-04

Search statement 2

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Search statement 2

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1/7 INPADOC - (C) INPADOC

PN - EP 925460 A1 19990630 [EP-925460]
TI - TWIST ACTION FRICTION DRIVE
LA - ENG
IN - PIERSE MICHAEL GEORGE [GB]
PA - UNOVA UK LTD [GB]
AP - EP 97918265/97-A 19970430 [1997EP-0918265]
PR - WO 9701174/97 (GB) -W 19970430 [1997WO-GB01174]
- GB 9618642/96-A 19960906 [1996GB-0018642]
IC - F16H-019/02
DS - DE* ES* FR* IT*

1/1 LEGALI - (C) LEGSTAT

PN - EP 925460 [EP-925460]
AP - EP 97918265/97 19970430 [1997EP-0918265]
DT - EP-P
ACTE- 19970430 EP/AE-A
EP-APPLICATION
{EP 97918265/97 19970430 [1997EP-0918265]}
- 19990630 EP/AK-A1 [+]
DESIGNATED CONTRACTING STATES IN AN APPLICATION WITH SEARCH REPORT:
DE ES FR IT
- 19990630 EP/A1 [+]
PUBLICATION OF APPLICATION WITH SEARCH REPORT
- 19990630 EP/17P [+]
REQUEST FOR EXAMINATION FILED
19980219
- 20010328 EP/17Q [+]
FIRST EXAMINATION REPORT
20010207
UP - 2001-13

2/7 INPADOC - (C) INPADOC

PN - GB 2316993 B2 20000726 [GB2316993]
TI - TWIST ACTION FRICTION DRIVE
IN - PIERSE MICHAEL GEORGE [GB]
PA - WESTERN ATLAS UK LTD [GB]; UNOVA UK LTD [GB]
AP - GB 9618642/96-A 19960906 [1996GB-0018642]
PR - GB 9618642/96-A 19960906 [1996GB-0018642]
IC - F16H-019/02

1/1 LEGALI - (C) LEGSTAT

PN - GB 2316993 [GB2316993]
AP - GB 9618642/96 19960906 [1996GB-0018642]
DT - GB-P
ACTE- 19960906 GB/AE-A
APPLICATION DATA
{GB 9618642/96 19960906 [1996GB-0018642]}
- 19980311 GB/A1
APPLICATION PUBLISHED
- 20000726 GB/B2 [+]
PATENT GRANTED

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UP - 2000-30

3/7 INPADOC - (C) INPADOC

PN - GB 9618642 A0 19961016 [GB9618642]
TI - TWIST ACTION FRICTION DRIVE
PA - WESTERN ATLAS UK LTD
AP - GB 9618642/96-A 19960906 [1996GB-0018642]
PR - GB 9618642/96-A 19960906 [1996GB-0018642]

4/7 INPADOC - (C) INPADOC

PN - GB 2316993 A1 19980311 [GB2316993]
TI - TWIST ACTION FRICTION DRIVE FOR CONVERTING ROTARY TO LINEAR MOTION
IN - PIERSE MICHAEL GEORGE
PA - WESTERN ATLAS UK LTD [GB]; UNOVA UK LTD [GB]
AP - GB 9618642/96-A 19960906 [1996GB-0018642]
PR - GB 9618642/96-A 19960906 [1996GB-0018642]
IC - F16H-019/02

1/1 LEGALI - (C) LEGSTAT

PN - GB 2316993 [GB2316993]
AP - GB 9618642/96 19960906 [1996GB-0018642]
DT - GB-P
ACTE- 19960906 GB/AE-A
APPLICATION DATA
{GB 9618642/96 19960906 [1996GB-0018642]}
- 19980311 GB/A1
APPLICATION PUBLISHED
- 20000726 GB/B2 [+]
PATENT GRANTED

UP - 2000-30

5/7 INPADOC - (C) INPADOC

PN - JP 11502293 T2 19990223 [JP11502293]
AP - JP 509463/98-A 19970430 [1998JP-0509463]
PR - WO 9701174/97 (GB)-W 19970430 [1997WO-GB01174]
- GB 9618642/96-A 19960906 [1996GB-0018642]
IC - F16H-019/02

6/7 INPADOC - (C) INPADOC

PN - US 5996431 A 19991207 [US5996431]
TI - TWIST ACTION FRICTION DRIVE
IN - PIERSE MICHAEL GEORGE [GB]
PA - UNOVA UK LTD [GB]
AP - US 51248/98-A 19980402 [1998US-0051248]
PR - GB 9618642/96-A 19960906 [1996GB-0018642]
- WO 9701174/97 (GB)-W 19970430 [1997WO-GB01174]
IC - F16H-021/16

1/1 LEGALI - (C) LEGSTAT

PN - US 5996431 [US5996431]
AP - US 51248/98 19980402 [1998US-0051248]
DT - US-P
ACTE- 19980402 US/AE-A
APPLICATION DATA (PATENT)
{US 51248/98 19980402 [1998US-0051248]}

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- 19991207 US/A
PATENT
UP - 2000-04

7/7 INPADOC - (C) INPADOC
PN - WO 9810206 A1 19980312 [WO9810206]
TI - TWIST ACTION FRICTION DRIVE
LA - ENG
IN - PIERSE MICHAEL GEORGE [GB]
PA - UNOVA UK LTD [GB]; PIERSE MICHAEL GEORGE [GB]
AP - WO GB 9701174/97(GB)-A 19970430 [1997WO-GB01174]
PR - GB 9618642/96-A 19960906 [1996GB-0018642]
IC - F16H-019/02
DS - JP* KR* SG* US* AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE

1/3 LEGALI - (C) LEGSTAT
PN - JP 509463/98
AP - JP 509463/98 - [1998JP-0509463]
DT - JP-A
ACTE- 19980227 JP/REFW-P
CORRESPONDS TO PCT APPLICATION
<WO 9810206> [WO9810206]
UP - 1998-51

2/3 LEGALI - (C) LEGSTAT
PN - US 51248/98
AP - US 51248/98 - [1998US-0051248]
DT - US-A
ACTE- 19980402 US/REFW-P
CORRESPONDS TO PCT APPLICATION
<WO 9810206> [WO9810206]
UP - 1998-44

3/3 LEGALI - (C) LEGSTAT
PN - WO 9810206 [WO9810206]
AP - WO 9701174/97(GB) 19970430 [1997WO-GB01174]
DT - WO-P
ACTE- 19970430 WO/AE-A
APPLICATION DATA
{WO 9701174/97(GB) 19970430 [1997WO-GB01174]}
- 19980227 WO/ENP-A
ENTRY INTO THE NATIONAL PHASE IN:
<JP 98509463>
- 19980312 WO/AK-A1 [+]
DESIGNATED STATES CITED IN A PUBLISHED APPLICATION WITH SEARCH REPORT
JP KR SG US
- 19980312 WO/AL-A1 [+]
DESIGNATED COUNTRIES FOR REGIONAL PATENTS CITED IN A PUBLISHED
APPLICATION WITH SEARCH REPORT
AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE
- 19980312 WO/A1 [+]
PUBLICATION OF THE INTERNATIONAL APPLICATION WITH THE INTERNATIONAL
SEARCH REPORT
- 19980402 WO/ENP-A
ENTRY INTO THE NATIONAL PHASE IN:
<US 9851248 19980402>
- 19980708 WO/121
EP: PCT APP. ART. 158 (1)
UP - 1998-51